

**REMARKS**

This responds to the Office Action mailed on June 5, 2007. By this response, claims 1, 4-6, 15, 17, 22 and 31 were amended, and claims 40-42 were canceled. No claims were added. As a result, claims 1-39 remain pending in this application. Reconsideration of this application in view of the above amendments and the following remarks is requested.

**Double Patenting Rejection**

Claims 1-42 were provisionally rejected under the ground of non-statutory obviousness-type double patenting as being unpatentable over claims 1-46 of co-pending Application No. 10/903,185 (884.C58US1).

Since the claims are only provisionally rejected under a non-statutory double patenting rejection, applicant requests that any action necessary to address or overcome this provisional rejection be held in abeyance until a notice of allowance is received in the co-pending Application No. 10/903,185 (884.C58US1). At the time of an indication of allowance in the co-pending application, Applicant will either argue against a double patenting rejection or file a terminal disclaimer.

**§103 Rejection of the Claims**

**Rejection:** Claims 1-42 were rejected under 35 USC § 103(a) as being unpatentable over Kenny et al. in view of Cannell et al.

**Response:** In order for the Examiner to establish a *prima facie* case of obviousness, three base criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference or references must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on

applicant's disclosure. *M.P.E.P.* § 2142 (citing *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed.Cir. 1991)).

Claim 1 as now amended recites "...a substrate... further comprising a thermal interface layer; and a plurality of micropins thermally coupled to the substrate...wherein the thermal interface layer is disposed between the plurality of micropins and the substrate." The Kenny et al. (US 2004/0206477 A1) reference fails to teach a thermal interface layer associated with the substrate to which the micropins are attached. According to Kenny et al. (US 2004/0206477 A1) the pillars are part of the interface layer as indicated by the following:

"It is preferred that the interface layer 302, 302' includes a plurality of pillars 303 disposed along the bottom surface 301. In addition, the pillars 303 alternatively has any shape, as discussed in relation to FIGS. 10A-10E and/or radially distributed fins 303E. Again, the interface layer 302 alternatively has any other features as discussed above (e.g. microchannels, roughened surfaces). The interface layer 302 as well as the features within the layer 302 also preferably has the same thermal conductivity characteristics as discussed above and will not be discussed again with respect to the preferred embodiment." [Emphasis added-- see paragraph 0102 of Kenny et al. (US 2004/0206477 A1)]

The Kenny et al. (US 2004/0206477 A1) characterizes the pillars as part of the interface layer and teaches having the entire interface layer having the same thermal conductivity.

As a result, Kenny et al. (US 2004/0206477 A1) fails to teach or suggest all the claim limitations. The Kenny et al. (US 2004/0206477 A1) reference does not teach or suggest a substrate to which the micropins are coupled that has a thermally conductive layer with a different thermal conductivity than the substrate. The Cannell et al. reference also fails to teach or suggest the substrate as claimed. As a result, the combination of Kenny et al. (US 2004/0206477 A1) and Cannell et al. fails to teach or suggest the substrate as claimed. As further evidence against any suggestion or modification, the Kenny et al. (US 2004/0206477 A1) actually teaches away from the claimed invention since Kenny et al. (US 2004/0206477 A1) teaches that the interface layer (that includes the substrate and the pillars) should have the same thermal conductivity. As a result, the Examiner's rejection of Claim 1 under 35 USC § 103(a) as being unpatentable over Kenny et al. in view of Cannell et al. is now overcome.

Claims 2-16 and 36-39 depend, either directly or indirectly from claim 1 and include the recitation of claim 1 by their dependence. Accordingly, claims 2-16 and 36-39 now also

overcome the Examiner's rejection under 35 USC § 103(a) as being unpatentable over Kenny et al. in view of Cannell et al.

Claim 17 recites "...a device having an inlet and an outlet, comprising: a substrate, and a plurality of micropins thermally coupled to the substrate...and a thermal interface layer associated with the substrate, the thermal interface layer having a different thermal conductivity than the substrate..." The Kenny et al. (US 2004/0206477 A1) reference does not teach or suggest a substrate to which the micropins are coupled that has a thermally conductive layer with a different thermal conductivity than the substrate. The Cannell et al. reference also fails to teach or suggest the substrate as claimed. As a result, the combination of Kenny et al. (US 2004/0206477 A1) and Cannell et al. fails to teach or suggest the substrate as claimed. As further evidence against any suggestion or modification, the Kenny et al. (US 2004/0206477 A1) actually teaches away from the claimed invention since Kenny et al. (US 2004/0206477 A1) teaches that the interface layer (that includes the substrate and the pillars) should have the same thermal conductivity. As a result, the Examiner's rejection of Claim 17 under 35 USC § 103(a) as being unpatentable over Kenny et al. in view of Cannell et al. is now overcome.

Claims 18-21 depend, either directly or indirectly from claim 1 and include the recitation of claim 1 by their dependence. Accordingly, claims 18-21 now also overcome the Examiner's rejection under 35 USC § 103(a) as being unpatentable over Kenny et al. in view of Cannell et al.

Claim 22 recites "...a substrate, the substrate thermally coupled to an integrated circuit (IC) die; a plurality of micropins thermally coupled to the substrate...wherein the substrate includes a thermal interface layer associated with the substrate, the thermal interface layer positioned between the micropins and a portion of the substrate..." The Kenny et al. (US 2004/0206477 A1) reference does not teach or suggest a substrate to which the micropins are coupled that includes a thermally conductive layer with a different thermal conductivity than the substrate. The Cannell et al. reference also fails to teach or suggest the substrate as claimed. As a result, the combination of Kenny et al. (US 2004/0206477 A1) and Cannell et al. fails to teach or suggest the substrate as claimed. As further evidence against any suggestion or modification, the Kenny et al. (US 2004/0206477 A1) actually teaches away from the claimed invention since Kenny et al. (US 2004/0206477 A1) teaches that the interface layer (that includes the substrate and the pillars) should have the same thermal conductivity. As a result, the Examiner's rejection

of Claim 22 under 35 USC § 103(a) as being unpatentable over Kenny et al. in view of Cannell et al. is now overcome.

Claims 23-30 depend, either directly or indirectly from claim 22 and include the recitation of claim 22 by their dependence. Accordingly, claims 23-30 now also overcome the Examiner’s rejection under 35 USC § 103(a) as being unpatentable over Kenny et al. in view of Cannell et al.

Claim 31 recites “...a substrate, the substrate thermally coupled to an integrated circuit (IC) die, the substrate including a thermal interface layer...positioned between a portion of the substrate and the micropins...” The Kenny et al. (US 2004/0206477 A1) reference does not teach or suggest a substrate to which the micropins are coupled that includes a thermally conductive layer with a different thermal conductivity than the substrate. The Cannell et al. reference also fails to teach or suggest the substrate as claimed. As a result, the combination of Kenny et al. (US 2004/0206477 A1) and Cannell et al. fails to teach or suggest the substrate as claimed. As further evidence against any suggestion or modification, the Kenny et al. (US 2004/0206477 A1) actually teaches away from the claimed invention since Kenny et al. (US 2004/0206477 A1) teaches that the interface layer (that includes the substrate and the pillars) should have the same thermal conductivity. As a result, the Examiner’s rejection of Claim 31 under 35 USC § 103(a) as being unpatentable over Kenny et al. in view of Cannell et al. is now overcome.

Claims 32-35 depend, either directly or indirectly from claim 31 and include the recitation of claim 31 by their dependence. Accordingly, claims 23-30 now also overcome the Examiner’s rejection under 35 USC § 103(a) as being unpatentable over Kenny et al. in view of Cannell et al.

Claims 40-42 have been canceled in this response thereby obviating the Examiner’s rejection under 35 USC § 103(a) as being unpatentable over Kenny et al. in view of Cannell et al. with respect to claims 40-42.

**RESERVATION OF RIGHTS**

In the interest of clarity and brevity, Applicant may not have addressed every assertion made in the Office Action. Applicant's silence regarding any such assertion does not constitute any admission or acquiescence. Applicant reserves all rights not exercised in connection with this response, such as the right to challenge or rebut any tacit or explicit characterization of any reference or of any of the present claims, the right to challenge or rebut any asserted factual or legal basis of any of the rejections, the right to swear behind any cited reference such as provided under 37 C.F.R. § 1.131 or otherwise, or the right to assert co-ownership of any cited reference. Applicant does not admit that any of the cited references or any other references of record are relevant to the present claims, or that they constitute prior art. To the extent that any rejection or assertion is based upon the Examiner's personal knowledge, rather than any objective evidence of record as manifested by a cited prior art reference, Applicant timely objects to such reliance on Official Notice, and reserves all rights to request that the Examiner provide a reference or affidavit in support of such assertion, as required by MPEP § 2144.03. Applicant reserves all rights to pursue any cancelled claims in a subsequent patent application claiming the benefit of priority of the present patent application, and to request rejoinder of any withdrawn claim, as required by MPEP § 821.04.

### CONCLUSION

As a result of the above amendments and remarks, Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney at (612) 373-6977 to facilitate prosecution of this application.

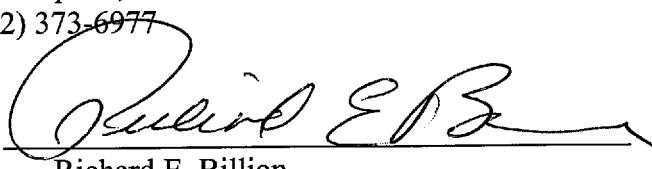
If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

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